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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,368	01/15/2004	Simon C. Steely JR.	200313752-1	5294
22879                      7590                      11/16/2009 HEWLETT-PACKARD COMPANY Intellectual Property Administration 3404 E. Harmony Road Mail Stop 35 FORT COLLINS, CO 80528				
EXAMINER				
ROJAS, MIDYS				
ART UNIT		PAPER NUMBER		
2185				
NOTIFICATION DATE		DELIVERY MODE		
11/16/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/758,368

**Applicant(s)**

STEELY ET AL.

**Examiner**

MIDYS ROJAS

**Art Unit**

2185

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10-13, 16-24 and 26-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 and 24 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-13, 17-23 and 26-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/28/2009
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. In view of applicant's remarks and in view of applicant's Declaration pursuant to 37 CFR 1.131, the examiner is withdrawing the previous rejection and providing a new rejection of the claims.

#### ***Response to Amendment***

2. The declaration filed on 10/7/2009 under 37 CFR 1.131 is sufficient to overcome the Steely, Jr et al. (US 7,380,107) reference.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 10-14, 17-23, and 26-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. (US 2002/0133674 A1)

Regarding Claim 1, Martin et al. discloses a multi-processor system (shown in Figure 1) comprising:

an owner predictor control (par. 0043, predictor of Fig 8) that provides an ownership update message corresponding to a block of data to at least one of a plurality

of owner predictors in response to a change in an ownership state of the block of data (block request, multicast snooping to predicted nodes , par. 0005), the update message comprising an address tag associated with the block of data and an identification associated with an owner node of the block of data (a request for data must include an identification of the block requested and the node); and

wherein a given one of the plurality of owner predictors, associated with a processor, comprises a first component that predicts an owner node of the block of data by observing the pattern of instructions within the processor and a second component that stores ownership update messages provided from the owner predictor control (par. 0071).

Regarding Claim 2, Martin discloses the system of claim 1, wherein the owner predictor control provides an ownership update message when the block of data at the owner node transitions to one of a modified or exclusive state (multicast due to request, thus the block will be accessed, thus modified or exclusive state, par. 0005).

Regarding Claim 3, Martin discloses the system of claim 1, further comprising a requesting node that provides a first request for the block of data to a home node, the requesting node being operative to provide a second request for the block of data to at least one predicted node in parallel with first request the at least one predicted node being selected by an associated one of the plurality of owner predictors (multicast to limited number of indicated caches, par. 0006).

Regarding Claim 4, Martin discloses the system wherein the requesting node receives a coherent copy of the block of data from at least one of the home node and the at least one predicted node, the requesting node consuming a first coherent copy of the block of data received (the node owning the block responds directly to requesting node, par. 0005).

Regarding Claim 5, Martin discloses the system of claim 3, wherein a cached copy of the block of data exists at the owner node, the home node issuing a third request for the block of data to the owner node (requests to directory, directory multicast request to a number of selected caches, thus third request, par. 0006).

Regarding Claim 6, Martin discloses the system of claim 5, wherein the system employs a directory-based cache coherency protocol, the home node further comprising a directory that maintains directory state information associated with the block of data, the home node issuing the third request to the owner node based on the directory state information indicating that the owner node has an exclusive cached copy of the block of data (par. 0006).

Regarding Claim 7, Martin discloses the system of claim 5, wherein the owner node provides one of (i) a response to the home node and (ii) a response to the home node and to the requesting node, the owner node providing the response based on a

state of the cached copy of the block of data at the owner node (the node owning the block responds directly to requesting node, par. 0005).

Regarding Claim 8, Martin discloses the system of claim 5, wherein the at least one predicted node comprises the owner node, the owner node having an exclusive cached copy of the block of data and providing a data response to the requesting node based on which of the second request and the third request arrives at the owner node first (the node owning the block responds directly to requesting node, par. 0005).

Regarding Claim 10, Martin discloses the system of claim 1, wherein the second component stores the provided update messages according to a first-in-first-out (FIFO) arrangement (prioritizes predictions based on recent interpretations, thus representing the storage of interpretations in FIFO order, par. 0071).

Regarding Claim 11, Martin discloses the system of claim 1, wherein the second component is operative to prioritize update messages according to a determination at the first component (prioritizes predictions based on recent interpretations, thus representing the storage of interpretations in FIFO order, par. 0071).

Regarding Claim 12, Martin discloses the system of claim 1, wherein the processor employs the given owner predictor to determine a predicted owner for a given block of data, the given owner predictor selecting between accessing the first

component and the second component according to the frequency in which ownership update messages associated with the block of data have been received from the owner predictor control (par. 0071).

Claim 13 is rejected using the same rationale as Claim 1 wherein Martin discloses a multi-processor network comprising (Fig. 1):

a first processor (12) that includes a cache having a plurality of cache lines associated with respective blocks of data, one cache line in the cache of the first processor transitioning to an ownership state based on a response to a request provided by the first processor (cache 22, par. 0045);

a second processor that includes an associated owner predictor (processor with predictor, Fig. 8 and par. 0043);

Regarding Claim 14, Martin discloses the network of claim 13, wherein the owner predictor control provides the update message to at least one other processor at a multi-processor node that is shared by the first processor (multicast to predicted nodes, par. 0005).

Claim 17 is rejected using the same rationale as Claim 6 wherein Martin discloses updating the directory (par. 0062).

Claim 18 is rejected using the same rationale as that of Claim 3.

Claim 19 is rejected using the same rationale as that of Claim 8.

Regarding Claim 20, Martin discloses the network of claim 17, further comprising an unordered network interconnect (par. 0049) that enables communication of requests, responses, and update messages among at least the first processor, the second processor and the home node (as shown in Fig. 1 and 8; par. 0044-46).

Claim 21 is rejected using the same rationale as that of Claims 1-3.

Claim 22 is rejected using the same rationale as that of Claims 4.

Claim 23 is rejected using the same rationale as that of Claims 5.

Claim 26 is rejected using the same rationale as that of Claim 8.

Regarding Claim 27, Martin discloses the system of claim 26, wherein the owner node provides a victim message to the home node and the data response to the requesting node in response to the third request arriving at the owner node prior to the second request, the home node providing a speculation acknowledgement to the requesting node in response to the victim message from the owner node (par. 0051).



Regarding Claim 28, Martin discloses the system of claim 26, wherein the owner node provides a victim message to the home node in response to the second request arriving at the owner node prior to the third request, the owner node also providing the data response to the requesting node in response to the second request from the requesting node (par. 0051).

Regarding Claim 29, Martin discloses the system of claim 21, wherein the at least one predicted node further comprises a target node having a cache that includes the data having one of an invalid state and a shared state (shared state, par. 0046), the at least one predicted node providing a miss response (mispredictions, par. 0062-0064) to the requesting node in response to the second request, and the owner node providing a data response to the requesting node in response to the third request (erroneous predictions, par. 0031).

Claim 30 is rejected using the same rationale as that of Claim 21.

Claim 31 is rejected using the same rationale as that of Claims 3-4.

Claim 32 is rejected using the same rationale as that of Claim 5.

Claim 33 is rejected using the same rationale as that of Claim 12.

Claim 34 is rejected using the same rationale as that of Claim 1.

Claim 35 is rejected using the same rationale as that of Claims 3-4.

Claim 36 is rejected using the same rationale as that of Claim 5.

Claims 37-38 are rejected using the same rationale as that of Claim 8.

Regarding Claim 39, Martin discloses the system of claim 1, wherein the owner predictor control is configured to discontinue providing the ownership update message corresponding to a given block of data based on at least one of (i) an available bandwidth in the system, or (ii) a frequency with which the given block of data changes ownership (communicating messages based on bandwidth, par. 0002).

Regarding Claim 40, Martin discloses the system of claim 1, wherein the owner predictor control is programmed to broadcast the ownership update message each of the plurality of owner predictors to indicate the change in the ownership state of the block of data (broadcasting, par. 0005).

Claim 41 is rejected using the same rationale as that of Claim 39.

***Allowable Subject Matter***

5. Claims 16 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims

Regarding Claim 16, the Prior Art of record does not teach nor suggest the network and owner predictor as claimed in combination with providing update messages to predict an owner based on the available bandwidth relative to a threshold value.

Regarding Claim 24, the Prior Art of record does not teach nor suggest the system and owner predictor as claimed in combination with the claimed forward and request channels.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIDYS ROJAS whose telephone number is (571)272-4207. The examiner can normally be reached on M-TH 6:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2185

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sanjiv Shah/

Supervisory Patent Examiner, Art Unit 2185

/Midys Rojas/

Examiner, Art Unit 2185

MR